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STATE OF MICHIGAN



JOHN ENGLER, Governor
DEPARTMENT OF ENVIRONMENTAL QUALITY

HOLLISTER BUILDING, PO BOX 30473, LANSING MI 48909-7973

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RUSSELL J. HARDING, Director

REPLY TO:

ENVIRONMENTAL RESPONSE DIVISION
KNAPPS CENTRE
PO BOX 30426
LANSING MI 48909-7926

June 28, 2000

Saugatuck-Douglas Library
Reference Desk
10 Mixer St.
Douglas, Michigan 49406

Subject: Allied Paper, Inc./Portage Creek/Kalamazoo River Superfund site.

Please find enclosed a copy of *Supplemental Kalamazoo River Sediment and Floodplain Soils Sampling Plan*, dated April 2000, for the above referenced Superfund site. Please log these documents appropriately and return the Fax Transmittal Form.

If you have any questions please contact me directly.

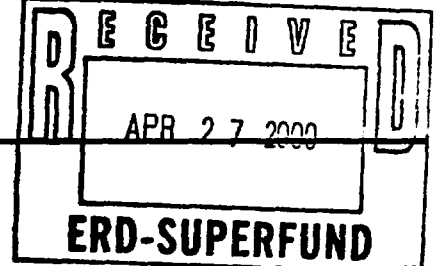
Sincerely,

A handwritten signature in cursive script, appearing to read "Brian von Gunten".

Brian von Gunten
Project Manager
Superfund Section
Environmental Response Division
517-373-6808

cc: File, P8

Supplemental Kalamazoo River Sediment and Floodplain Soils Sampling Plan



Introduction

Kalamazoo River sediment, sediment and/or soil from Ottawa and Pottawattamie marshes, and floodplain soils will be collected and analyzed as part of the Remedial Investigation/Feasibility Study (RI/FS) for the Allied Paper, Inc./Portage Creek/Kalamazoo River Superfund Site. This plan describes the supplemental sampling and analyses proposed for Kalamazoo River sediment between Morrow Dam and Calkins Dam (Phase I), from Calkins Dam downstream to Lake Michigan, as well as sediment and/or soil from Ottawa and Pottawattamie marshes and floodplain soils between Calkins Dam and Lake Michigan (Phase II).

The overall objectives of this sediment sampling work plan are to:

- Determine the nature and extent of polychlorinated biphenyl (PCB) contamination.
- Provide data that may be used to evaluate human health and ecological risks.

Activities will include analyses for PCB and particle sizes in soils (in accordance with American Society for Testing and Materials Method D-422) of those previously collected and subsequently frozen cores. In addition, the collection and analyses of sediment cores from the Kalamazoo River between Calkins Dam and Lake Michigan, and collection and analyses of marsh and floodplain soil samples from between Calkins Dam and Lake Michigan will also be conducted. The work is scheduled to be performed by Blasland, Bouck & Lee, Inc. (BBL) on behalf of the Kalamazoo River Study Group (KRSG). Unless otherwise noted, all sampling will be conducted in accordance with methods and procedures detailed in the 1993 Field Sampling Plan (FSP; BBL, 1993), and all sampling handling and analysis in accordance with the 1993 Quality Assurance Project Plan (QAPP; BBL, 1993), modified as necessary to comply with current protocols and SW-846 requirements.

Phase I Activities

Analysis of Previously Collected RI Sediment Cores

Sediment cores collected between Morrow Lake and Calkins Dam during the 1993-1994 RI sampling effort will be retrieved from frozen storage and analyzed for PCB Aroclors, total PCB, total organic carbon (TOC), and particle sizes. The core selection protocol is as follows:

- 1) All cores collected between the A-Site and Portage Creek confluence with the Kalamazoo River (transects KPT4 through KPT20) will be sectioned and analyzed, with the exception of samples that the Michigan Department of Environmental Quality (MDEQ) determines are obviously composed of very coarse materials and devoid of paper residuals.
- 2) Between the Portage Creek confluence and Baseline Road near Plainwell (transects KPT21 - KPT48), at least 50% of the available frozen cores will be sectioned and analyzed, without regard to grain size. In addition, the remaining cores will be visually inspected and any core found to have either fine-grain sediment, organic material, or visible paper residual waste will be sectioned and analyzed
- 3) Cores that were collected from the approximately two-mile section of the Kalamazoo River downstream of Trowbridge Dam (Transects KPT109 through KPT-115A) and not previously analyzed, will be analyzed as

an activity of this plan. These cores include KPT109-2 through KPT109-7, KPT110-1 and KPT-110-6, KPT114-1, KPT115A-3, and KPT115A-4.

- 4) Sixteen cores from Allegan City Impoundment will be sectioned and analyzed. These cores are KPT131-8, KPT133-3, KPT133-4, KPT133-5, KPT134-1, KPT134-4, KPT134-6, KPT135-4, KPT135-5, KPT136-1, KPT136-4, KPT137-1, KPT137-6, KPT138-2, KPT139-3, and KPT139-5.
- 5) Twelve cores from the section of river between Allegan City Dam and the Highway M40/M89 bridge will be sectioned and analyzed. These cores are KPT140-4, KPT140-6, KPT141-1, KPT142-4, KPT143-3, KPT143-5, KPT143-7, KPT145-6, KPT145-8, KPT147-1, KPT147-3, and KPT147-5.
- 6) Twenty-one specific cores from Lake Allegan will be sectioned and analyzed. These cores are KPT148-3, KPT148-5, KPT149-2, KPT149-4, KPT152-2, KPT152-4, KPT152-8, KPT153-8, KPT154-2, KPT154-4, KPT154-6, KPT154-8, KPT155-2, KPT155-7, KPT156-2, KPT156-4, KPT156-6, KPT157-3, KPT157-4, KPT159-2, and KPT159-7.

A summary of the sediment sampling program is presented in Table 1. In all, a minimum of 170 previously collected cores will be processed and analyzed and potentially, approximately 70 additional previously collected cores will be analyzed, contingent on MDEQ's visual inspection of the sediment cores. Recommendations regarding analysis of additional cores collected from the former Plainwell, Otsego, and Trowbridge impoundments will be provided by MDEQ taking into consideration the analytical results of cores collected from Lake Allegan and Allegan City Impoundment.

All cores selected for analysis will be sectioned into the 0- to 2-inch depth interval, the 2- to 6-inch depth interval, the 6- to 12-inch depth interval, and into one foot intervals after that. For all cores, the 0-2 inch, 2-6 inch, 6-12 inch, and 12-24 inch samples will be submitted to the laboratory for PCB Aroclor, total PCB, TOC, and particle size analyses. For cores collected from impounded areas, the 24-36 inch sample will be submitted for the same analyses as well. The deeper increments not analyzed from each selected core will be re-frozen for potential future analysis. If PCB are detected in the bottom-most section analyzed from a core, the deeper sections will be sequentially submitted for analysis until PCB are not detected or the core has been completely analyzed. All sample handling and analysis will be consistent with the QAPP and FSP, modified as necessary to comply with current protocols and SW-846 requirements.

Concurrent with the sectioning and analysis of frozen cores, historical aerial photographs and available maps will be evaluated by MDEQ personnel to identify likely depositional zones, recently active oxbows, islands, accidental, permitted and un-permitted waste disposal areas that have as yet been unidentified during the RI process. Focused sampling of these areas will be conducted under the direction of the MDEQ.

Phase II Activities

Sediment Sampling between Lake Allegan (Calkins Dam) and Lake Michigan

In this sampling plan, a pilot study will be conducted in which an unbiased set of sediment cores collected in the field and a subset of these cores are analyzed for PCB Aroclors, total PCBs, TOC, particle sizes, and other qualitative factors such as color, presence of paper waste or oils, etc. Based on this initial pilot set of sediment cores, the MDEQ will make decisions regarding the analysis of the remaining sediment and soil cores. Alternatives under consideration may include analysis of all remaining cores using the same methods as for the pilot data, analysis of a stratified sample of the remaining cores, or a combination of these methods applied to particular areas within the site.

In accordance with MDEQ directives, Kalamazoo River sediment downstream of Lake Allegan (Calkins Dam) will be sampled using a transect-based design. Other than the exceptions noted below, sediment transects will be spaced approximately at 1,000 foot intervals between Calkins Dam and Lake Michigan, and a minimum of six cores will be collected from each for analyses.

Twelve sediment transects (KPT160-KPT171) were sampled downstream of Calkins Dam during the 1993-1994 RI activities. Cores collected from these sediment transects remain in frozen storage, and will be substituted for the collection of new cores. However, due to the wider spacing of the 1993-94 transects, additional transects will be established:

- 4 new transects between Calkins Dam and KPT160;
- 1 new transect between KPT161 and KPT162;
- 1 new transect between KPT162 and KPT163;
- 1 new transect between KPT163 and KPT164;
- 91 new transects between KPT171 and the US-131 bridge; and
- 16 new transects between Kalamazoo Lake and Lake Michigan.

Figure 1 presents the approximate locations of the proposed transects as determined by MDEQ as well as the transects sampled in 1993-1994.

At each transect, sediment cores will be collected five feet from each shore, and from four locations spaced equally between these two near-bank cores. At transects where cores were previously collected without near-bank cores, additional cores will be collected five feet from each bank. Each sediment transect will then include six or eight individual cores.

Sediment cores will be collected by driving Lexan® tubing into the sediment until refusal, creating a vacuum, and retrieving the cores intact. The location of each core, as well as the edge of water and the top of bank, will be surveyed using conventional survey methods or Global Positioning System (GPS) technology. The water depth, sediment depth and thickness of sediment recovered at each core location also will be recorded. All recovered cores will be described, photographed and retained in frozen storage.

Samples from a subset of 63 sediment cores will be sectioned into sample intervals of 0- to 2-inch, 2- to 6-inch, 6- to 12-inch, and subsequent one-foot intervals to the bottom of the core. At the discretion of MDEQ or MDEQ oversight contractor, cores may be further sectioned if distinct horizons are observed in the core. Analysis for PCB Aroclors, total PCB, total organic carbon, and particle sizes will be conducted for each sample of the upper two-feet of the core from the subset of 63 cores. The deeper increments not analyzed from each core will be frozen for potential future analysis. If PCB are detected in the bottom-most section analyzed from a core, the deeper sections will be sequentially analyzed until PCB are not detected or the entire core has been appropriately analyzed.

The initial 63 cores that are analyzed will be determined using a fixed spacing method where core positions one through six will be repeatedly and sequentially analyzed from every other transect (i.e., every odd-numbered transect). This will result in one core for analysis every 2,000 feet. Based on the results of analysis of the first 63 sediment cores, analysis of additional cores may be necessary. Further sampling efforts may also be required, based on the concentration and frequency of PCB detections, as well as the variability in the PCB data. A stratified sample design may be implemented, where appropriate.

In order to provide sufficient sample volume for analysis, additional sediment will be collected at each core location. The additional core(s) will be sectioned in the field into the 0- to 2-inch and 2- to 6-inch depth intervals for particle

size analysis. An additional core at least one-foot deep will then be collected from each location and placed in frozen storage for potential future analyses.

Ottawa Marsh, Pottawattomie Marsh, and Kalamazoo Lake Sediment and Soil Sampling

Ottawa Marsh, Pottawattomie Marsh and Kalamazoo Lake (including Douglas Bayou) will be sampled using a grid-based approach. MDEQ has generated grids of 155 nodes where cores will be collected in each marsh, and 75 nodes in Kalamazoo Lake (see Figures 2 and 3 and 4). Grid locations will be surveyed using conventional survey methods or GPS technology. To fit the appropriate number of sample locations within an area, the grid size will range from approximately 400 feet in Kalamazoo Lake to approximately 800 feet in Ottawa Marsh. Because of potential positional mapping errors associated with the exact grid locations, some proposed sample locations may be located outside the marsh areas. The MDEQ will use discretion in relocating any of these samples to the closest area within the lake or marsh. If locations targeted for PCB analysis must be deleted from the design due to larger mapping areas, MDEQ will select replacement core locations from the grid.

In each of the two marshes, 155 cores will be collected and the depth of water, depth of sediment/soil, and thickness of sediment/soil will be recorded. The basis for this number was provided in earlier guidance from MDEQ (letter dated August 16, 1999) as being related to the precision of estimates of the geometric mean PCB concentration. Of the 155 cores collected from each marsh, every third north/south-oriented gridline of cores (50 cores per marsh) will be sectioned and submitted to the laboratory for analysis, while the remaining cores (105 per marsh) will be retained in frozen storage. Sample grids for Ottawa Marsh and Pottawattomie Marsh are shown in Figures 2 and 3, respectively. Two out of every three north/south-oriented grid line of cores from Kalamazoo Lake will be analyzed, for a total of 50 cores. The remaining 25 cores from Kalamazoo Lake will be frozen for potential future analyses. The proposed sampling grid for Kalamazoo Lake is shown in Figure 4.

Cores will be collected by driving Lexan® tubing in to the sediment until refusal, creating a vacuum, and retrieving the core intact. Marsh cores will be segmented into 0- to 6-inch and 6- to 12-inch depth intervals, and every foot thereafter to the bottom of the core. Kalamazoo Lake sediment cores will be further segmented into the 0- to 2-inch and 2- to 6-inch depth increments. Samples from cores collected from the marshes will be analyzed to a depth of 2 feet (3 samples), and cores collected from the Kalamazoo Lake will be analyzed to a depth of 3 feet (5 samples). All samples will be analyzed for PCB Aroclors, total PCB, TOC, and particle size distribution. The deeper increments not analyzed from each selected core will be frozen for potential future analysis. If PCB are detected in the bottom-most section analyzed from a core, the deeper sections will be sequentially submitted for analysis until PCB are not detected or the core is completely analyzed. Additional Kalamazoo Lake sediment may need to be collected at core locations to provide sufficient sample volume for analysis, following the procedures previously described.

Floodplain Soil Sampling

Floodplain soils between Calkins Dam and Lake Michigan will be sampled at core locations along 12 transects. In general, transects will be perpendicular to the river flow and may extend to the edge of the 100-year floodplain. Ten transect locations selected by MDEQ are shown in Figure 1; however, they are subject to revision based on accessibility and MDEQ discretion. The remaining two transects will be located by MDEQ oversight personnel. Some transects shown in Figure 1 do not meet the criteria of being perpendicular to river flow or extending to the 100-year floodplain. These transects may be relocated by the MDEQ, as necessary. Available maps will be reviewed prior to the commencement of sampling, and transects may be adjusted by the MDEQ so access can be obtained via public land. Those transects which remain on private land will be sampled pending access.

Along each transect, ten approximately equal-spaced cores will be collected using a stainless steel auger or split spoon sampler. For transects less than 1,000 feet in length, cores will be collected every 100 feet. Cores will be collected

to a two-foot depth. The location and elevation of each core will be surveyed using conventional survey methods or GPS technology. Each core will be described and photographed, and per agreements made in the October 28, 1999 meeting between MDEQ and KRSG representatives, the five cores closest to the river and presumably lowest in elevation will be sectioned and submitted for laboratory analysis. The remaining five cores will be retained for subsequent analysis if the analytical results indicate PCB to be present in the adjacent core at concentrations greater than 0.12 mg/kg.

Cores submitted for analysis will be sectioned into the 0- to 6-inch, 6- to 12-inch, and 12-to-24-inch depth intervals. All samples will be analyzed for PCB Aroclors, total PCB, TOC, and particle size distribution.

Schedule

The field efforts are anticipated to take approximately four and one-half months to complete. Sectioning of frozen 1993/94 cores began December 7, 1999 and sediment sampling in the lower river began January 10, 2000. The field schedule for completing the supplemental sediment and floodplain soils sampling program is presented below.

Field Activity	Duration	Start Date	Completion Date
Processing of Frozen 1993 Sediment Cores	5 weeks	December 6, 1999	January 14, 2000
Ottawa Marsh, Pottawattomie Marsh and Kalamazoo Lake Sediment Sampling	15 weeks	January 10, 2000	May 5, 2000
Sediment Sampling of Lower River	11 weeks	January 10, 2000	May 12, 2000
Floodplain Soil Sampling	3 weeks	March 27, 2000	May 5, 2000

In addition to the tasks listed above, BBL will begin collecting the 114 Focused Sediment /Soil Cores that the MDEQ selected, beginning on May 1, 2000. The completion date for the focused sampling is approximately May 29, 2000. All Phase I sampling and analyses will be completed and incorporated into the RI/FS report due by mid-September. Many of the field activities to be conducted are weather, temperature, or access dependent. In addition, the scopes of certain tasks (e.g., selection of frozen cores to be analyzed) may be expanded depending upon observations in the field. Several of the tasks are designed with an iterative process of sample analysis and subsequent evaluation of the results to determine the need and scope for additional sampling and analysis. The actual schedule of tasks may therefore change, to accommodate these constraints. The Phase I RI/FS report will be submitted September 15, 2000; if no additional Phase II sampling is required by MDEQ that RI/FS report will also be submitted on September 15, 2000.

Laboratory analysis will follow sample collection and will occur simultaneously with continuing sampling efforts. Based on the rate of sample production, the project laboratory will endeavor to complete sample analysis and quality assurance/quality control (QA/QC) review, and resolve any QA/QC problems within 60 days of sample receipt. The analytical data will then be entered into the database and evaluated against QA/QC criteria in accordance with the guidelines established in the QAPP to verify the data integrity.

BBL will submit comprehensive bi-weekly status reports to the MDEQ to track and document the process being used to gain access to private properties.

Data Reporting

All data gathered from these investigations will be submitted to MDEQ following QA/QC review to ensure compliance with the appropriate QA/QC requirements outlined in the QAPP. Based on MDEQ review of the data, additional investigation and/or analysis may be necessary. Data submitted will include but not be limited to:

- notes taken in the field (e.g., logbooks) and photographs;
- site survey data for any investigations conducted under this work plan;
- chain-of-custody forms;
- laboratory bench sheets; and,
- Electronic files of analytical results.

Data will be submitted in groups that will include one each for the frozen core sampling and analysis, the lower river sediment sampling and analysis, the marsh and Kalamazoo Lake sampling and analysis, and the floodplain soils sampling and analysis. Data submittals will occur when the respective investigation is completed, or as otherwise agreed to, and when the data have been compiled and undergone QA/QC review.

Project Management

Project management for the sampling, analysis, and data reporting activities described in this work plan will be performed by BBL on behalf of the KRSG. Key BBL personnel, their roles, and phone numbers are listed below:

Project Officer	BBL	Mark P. Brown, Ph.D.	315-446-9120
Task Manager	BBL	Michael D. Scoville	315-446-9120
Field Manager	BBL	Richard P. DiFiore	315-446-9120
Field Office	BBL	Todd Merrell	616-385-3388 315-447-2105
Quality Assurance Manager	BBL	Laurie A. Indick	315-446-9120

A project organization chart for the sediment, marsh and floodplain soil sampling is provided in Figure 5 and includes MDEQ oversight. All sample analyses will be performed by Severn-Trent Laboratory in Burlington, Vermont.

Table 1

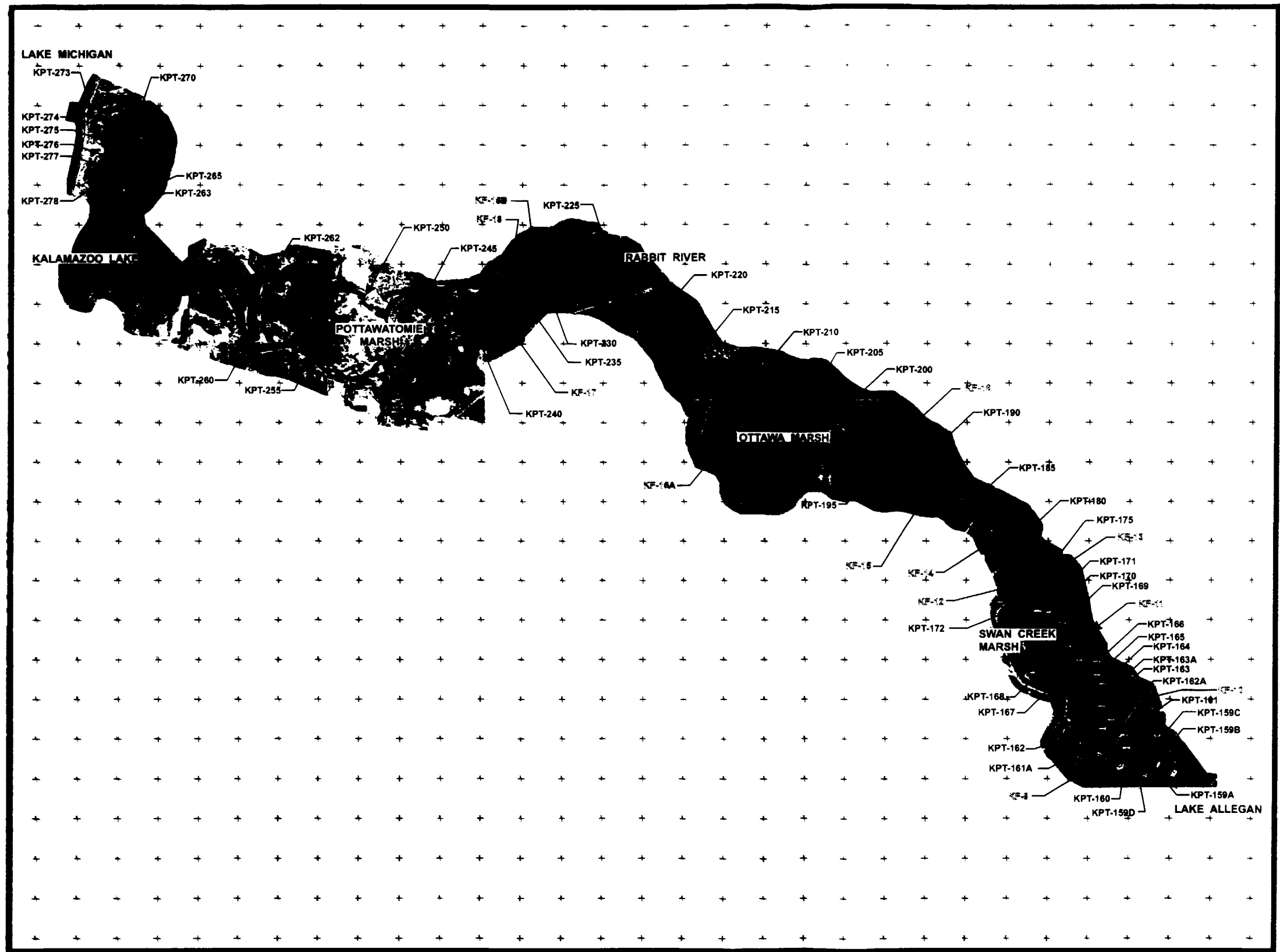
Allied Paper, Inc./Portage Creek/Kalamazoo River Superfund Site

Kalamazoo River Sediment, Ottawa and Pottawatomie Marshes, and Floodplain Soil Sampling Summary

Location	Sample Types	Sample No.	Sample Interval	Parameter/Analysis
Morrow Dam to Calkins Dam	Sediment Characterization Cores	170+ Cores	0-2 inch, 2-6 inch, 6-12 inch, and 12-24 inch; also the 24-36 inch section for cores collected from impoundments	PCB Aroclors, Total PCB, Total Organic Carbon, Particle Size Distribution
	Focused Sampling (depositional areas)	114 Cores	0-2 inch, 2-6 inch, 6-12 inch, and 12-24 inch; also the 24-36 inch section for cores collected from impoundments	PCB Aroclors, Total PCB, Total Organic Carbon, Particle Size Distribution
Calkins Dam to Lake Michigan	117 Transects of 6 or 8 Cores each	Analyze initial subset of 63+ Cores	0-2 inch, 2-6 inch, 6-12 inch, 12-24 inch	PCB Aroclors, Total PCB, Total Organic Carbon, Particle Size Distribution
	Ottawa Marsh (155 Cores) Pottawatomie Marsh (155 Cores)	Analyze initial subset of 50 Cores from each marsh	0-6 inch, 6-12 inch, 12-24 inch	PCB Aroclors, Total PCB, Total Organic Carbon, Particle Size Distribution
	Kalamazoo Lake (75 Cores)	Analyze initial subset of 50 Cores	0-2 inch, 2-6 inch, 6-12 inch, 12-24 inch, 24-36 inch	PCB Aroclors, Total PCB, Total Organic Carbon, Particle Size Distribution
	12 Floodplain Transects of 10 Cores each	Analyze initial subset of 5 Cores closest to River, per transect	0-6 inch, 6-12 inch, 12-24 inch	PCB Aroclors, Total PCB, Total Organic Carbon, Particle Size Distribution

NOTES:

Sediment sample intervals not submitted for analysis will be retained in frozen storage for potential future analysis. If PCB are detected in the bottom-most section analyzed from a core, the deeper sections will be sequentially submitted for analysis until PCB are not detected or the core is completely analyzed.



LEGEND:

- Sample and Preserve
- Sample and Analyze
- Sediment Sampling Transects
- Stream Limit
- Floodplain Sampling Transects
- Existing BBL Sediment Transect Locations

Feet



AREA LOCATION

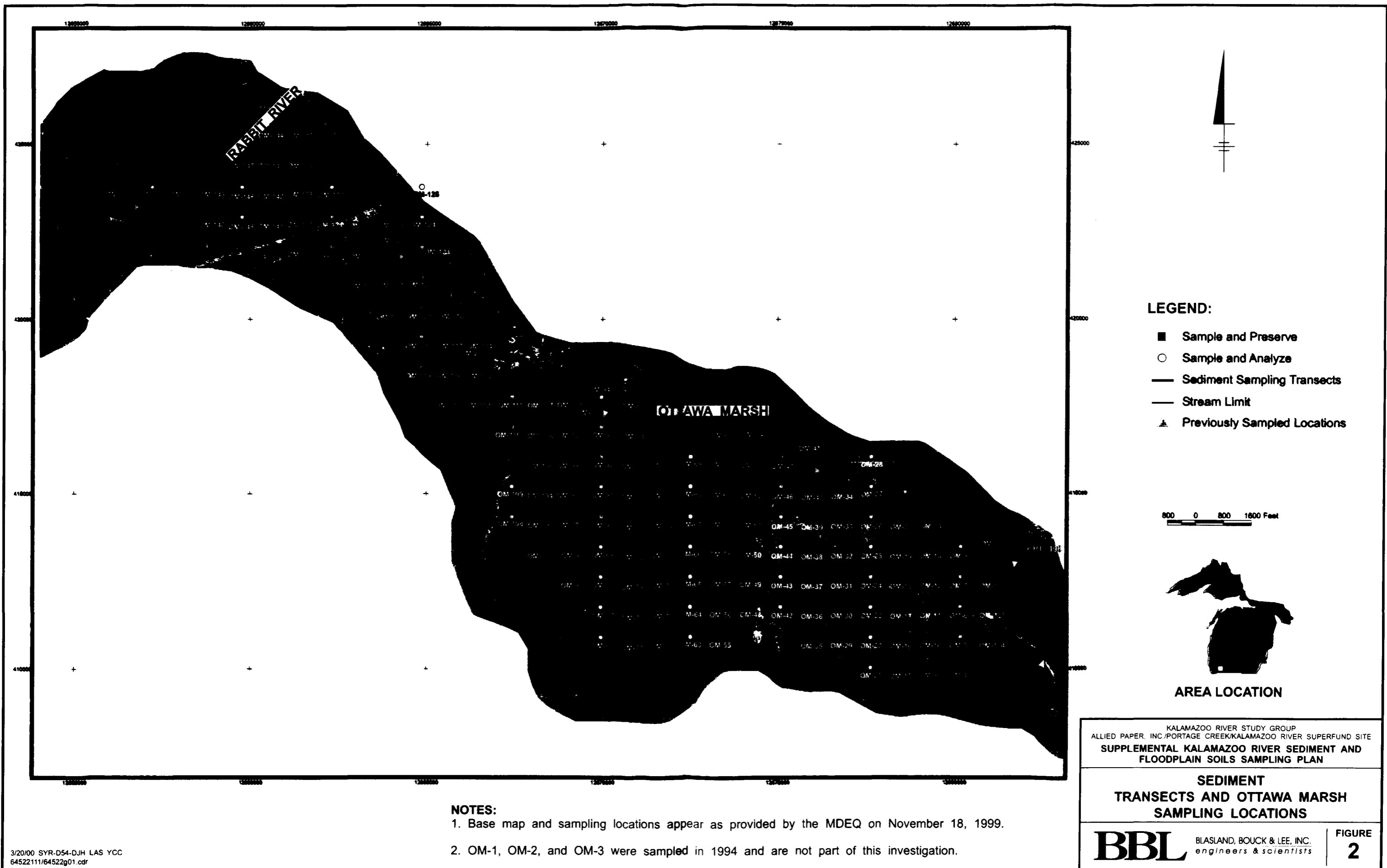
NOTE: Base map and sampling locations appear as provided by the MDEQ on November 18, 1999.

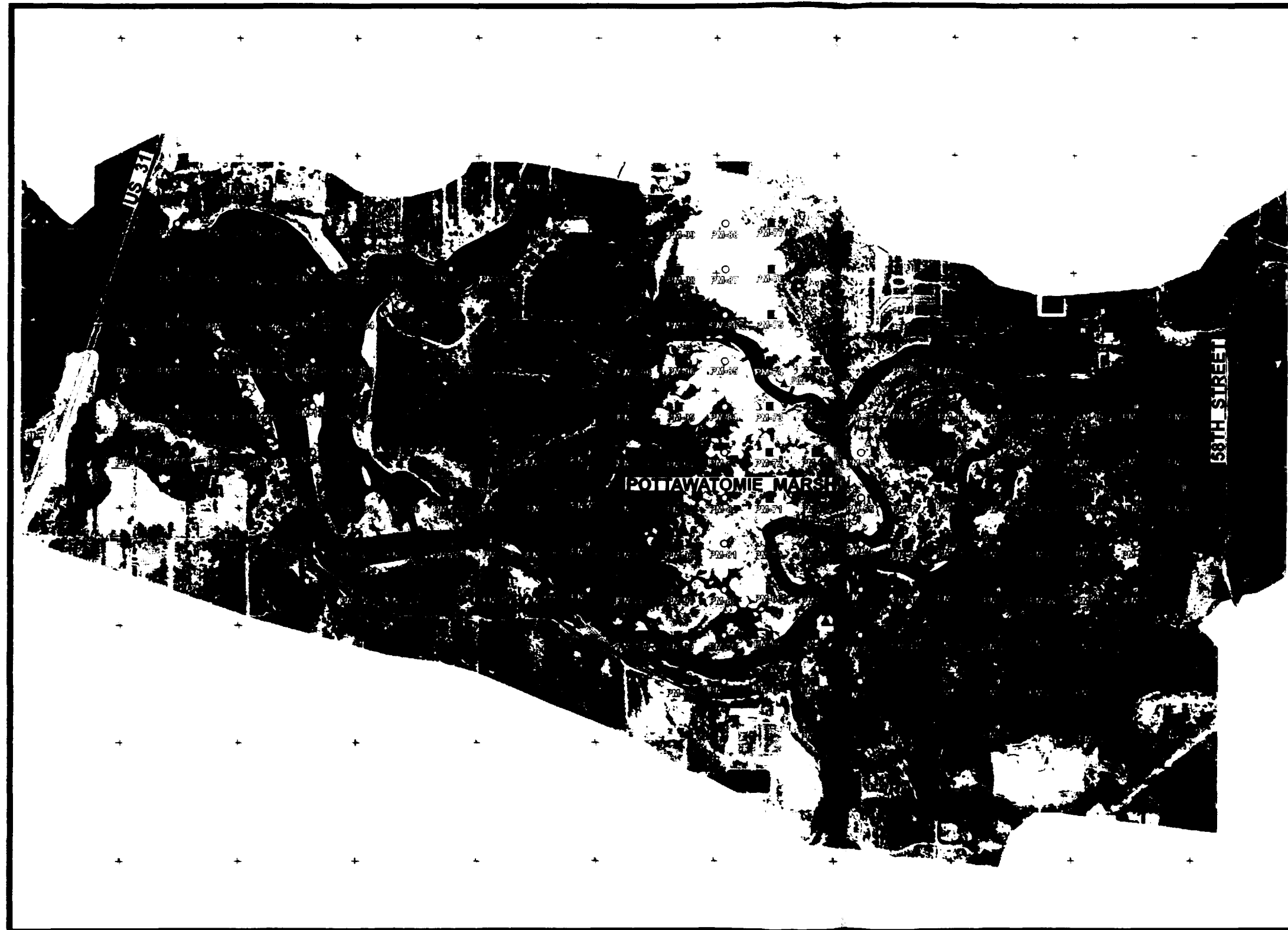
KALAMAZOO RIVER STUDY GROUP
ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER SUPERFUND SITE
**SUPPLEMENTAL KALAMAZOO RIVER SEDIMENT AND
FLOODPLAIN SOILS SAMPLING PLAN**

**SEDIMENT AND
FLOODPLAIN TRANSECT LOCATIONS**

BBL BLASLAND, BOUCK & LEE, INC.
engineers & scientists

**FIGURE
1**





LEGEND:

- Sample and Preserve
- Sample and Analyze
- Sediment Sampling Transects
- Stream Limit
- ▲ Previously Sampled Locations



AREA LOCATION

NOTES:

1. Base map and sampling locations appear as provided by the MDEQ on November 18, 1999.
2. PM-1, PM-2, and PM-3 were sampled in 1994 and are not part of this investigation.

KALAMAZOO RIVER STUDY GROUP
ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER SUPERFUND SITE
SUPPLEMENTAL KALAMAZOO RIVER SEDIMENT AND
FLOODPLAIN SOILS SAMPLING PLAN

SEDIMENT TRANSECTS AND POTTAWATOMIE MARSH SAMPLING LOCATIONS

BBL BLASLAND, BOUCK & LEE, INC.
engineers & scientists



LEGEND:

- Sample and Preserve
- Sample and Analyze
- Stream Limit
- Previously Sampled Locations

500 0 500 1000 Feet



AREA LOCATION

NOTES:

- 1.Base map and sampling locations appear as provided by the MDEQ on November 18, 1999.
- 2.KL-1 and KL-2 were previously sampled and are not part of this investigation.

KALAMAZOO RIVER STUDY GROUP
ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER SUPERFUND SITE
SUPPLEMENTAL KALAMAZOO RIVER SEDIMENT AND
FLOODPLAIN SOILS SAMPLING PLAN

KALAMAZOO LAKE SAMPLING LOCATIONS

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engineers & scientists

FIGURE
4